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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04M 3/42, 3/00, 3/50

A1

(11) International Publication Number: WO 98/07266

(43) International Publication Date: 19 February 1998 (19.02.98)

(21) International Application Number: PCT/CA97/00570

(22) International Filing Date: 14 August 1997 (14.08.97)

(30) Priority Data:
60/023,903 14 August 1996 (14.08.96) US

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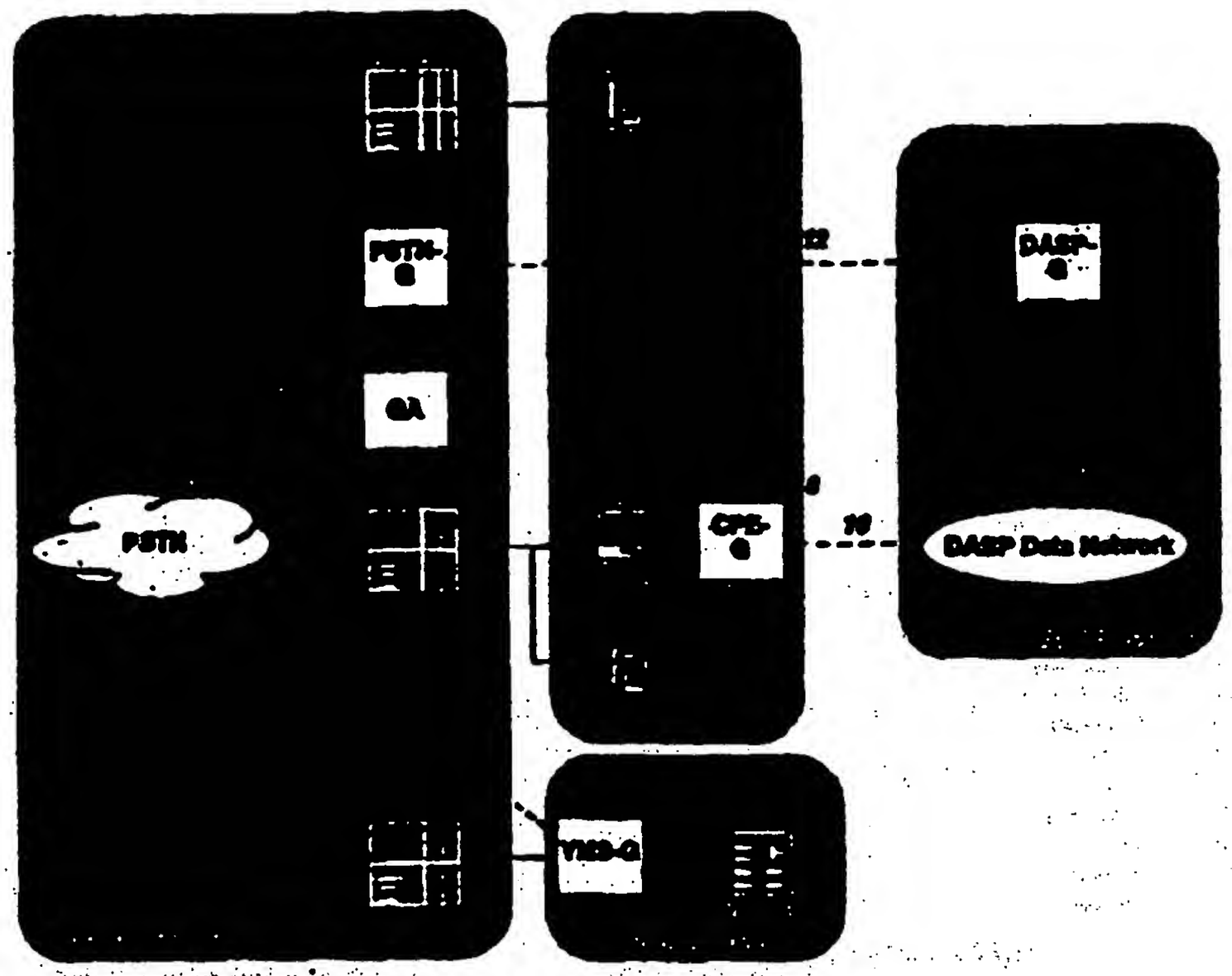
(81) Designated States: CA, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: INTERNET-BASED TELEPHONE CALL MANAGER

(57) Abstract

A method is provided that allows data access service provider subscribers to manage their telephone service through a data connection. The subscriber is enabled to obtain call data information and is provided real-time control. During a data call, a visual incoming call indicator informs the subscriber, through a pop-up window, connected to the data access service provider that there is a call attempt. A visual message waiting indicator allows a subscriber, connected to the data access service provider to be notified of a pending message on the voice message system. A visual call disposition allows the subscriber, through the data connection, to dispose of calls. The call disposition options include forwarding a call to voice mail, playing an announcement to the calling party, forwarding the call to another line, sending a text message which could be converted to speech using text to speech technology, answering the call using voice over data call or terminating the data connection in order to accept the call.



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terminal, responsive to receiving the signal, an incoming call indication.

According to another aspect of the present invention there is provided a method of providing an indication of a message waiting at a voice messaging service to a called station coupled to a telecommunications network, the called station having a data processing terminal engaged in a data call with a data communications network, the data call being through a connection in the telecommunications network to an access gateway for the data network, the method comprising the steps of providing, by the telecommunications network, an incoming call intended for the called station to a voice messaging service whereby the incoming call may record a message, providing a signal advising of the message waiting from the access gateway, over the data call connection through the telecommunications network, to the data processing terminal and generating by the data processing terminal, responsive to receipt of the signal, the message waiting indication.

According to a further aspect of the present invention there is provided a method of disposing of an incoming call intended for a called station coupled to a telecommunications network, the called station having a data processing terminal engaged in a data call with a data communications network, the data call being through a connection in the telecommunications network to an access gateway for the data network, the method comprising the steps of holding call processing of the incoming call at a switching system in the telecommunications network, providing a signal advising of the incoming call from the access gateway, over the data call connection through the telecommunications network, to the data processing terminal, receiving from the data processing terminal, via the access gateway, instructions for disposing of the incoming call and continuing the call processing of the incoming call at the switching system according to the received instructions.

cannot check if they have pending messages without terminating their session. The visual message waiting indicator allows them to be informed of their mailbox status within their Internet session.

Terminology and acronyms

- Caller

  Person that calls the subscriber. The caller can reach the subscriber in two ways, either directly, i.e., the caller dials the subscriber's DN, or indirectly, i.e., the caller dials a DN that is forwarded to the subscriber's DN.

- Data Access Service Provider (DASP)

  Data network operator that sells access services to its data network that allows the subscribers to communicate through the DASP's network and other data networks.

- DASP user

  Person that subscribes to and uses DASP services.

- Forwarding from station number (FF)

  Parameter conveyed over the control between the PSTN and the VMS system and used by the VMS system as the mailbox identifier.

- Subscriber

  A DASP user that subscribes also to the Call Manager service.

- VMS subscriber

  Person that subscribes to a VMS.

Acronyms

- BRI - Basic Rate Interface
- CPE - Customer Premise Equipment
- DASP - Data Access Service Provided
- DN - Directory Number
- ICM - Internet Call Manager
- ISDN - Integrated Services Digital Network
- ISP - Internet Service Provider
- MWI - Message Waiting Indicator

Telephone Network (PSTN) and Data Access Service Provider (DASP) enhanced signalling and data communication capabilities to provide incoming call information and control to a DASP subscriber.

In the following descriptions, specific instances of the PSTN enhanced signalling capabilities are used for the purpose of describing the concept. However, those skilled in the art will recognize that the scope of this invention is not limited to these specific instances. To ease description, functional call flows are used.

Brief Description Of The Drawings

The present invention will be further understood from the following description with reference to the drawings in which:

Fig. 1 illustrates an overview of a network in which the method in accordance with the present invention can be used;

Figs. 2 and 3 graphically illustrate the call-indication functional flow in accordance with another embodiment of the present invention;

Fig. 4 graphically illustrates the call-indication functional flow in accordance with a further embodiment;

Fig. 5 graphically illustrates the message waiting indication functional flow in accordance with a further embodiment of the present invention;

Fig. 6 graphically illustrates the message waiting indication functional flow in accordance with an additional embodiment of the present invention;

Figs. 7 and 8 graphically illustrate the incoming call disposition functional flow in accordance with a still further embodiment of the present invention.

Detailed Description

Referring to Fig. 1 there is provided a view of the network components and interfaces required by this method. The network components are grouped into four (4) domains, i.e., the PSTN domain, the DASP domain, the Voice Message Service - Service Provider (VMS-SP) domain and the

The PSTN Gateway Agent (GA) [19] is the PSTN component that provides the PSTN-G [4] with the incoming call information and remote call control for incoming calls to registered subscribers [17].

The VMS-SP's VMS gateway's (VMS-G) [5] responsibility is to provide the PSTN gateway [4] with the MWI information for registered subscribers [17].

The DASP gateway (DASP-G) [6] is the DASP component that implements the PSTN-DASP signalling. Through interface [12], the DASP gateway obtains from the PSTN gateway [4] the incoming call indication and control for all registered subscribers [17]. The main responsibility of the DASP gateway is then to mediate, through interface [9], DASP data network [8] and interface [10], with the subscriber's [17]. For call disposition service, the CPE gateway receives the subscriber's inputs from the HMI and translates the call disposition request in the appropriate message format for delivery to the DASP gateway [6].

The above components can be implemented in various ways. A single component can be implemented as a stand-alone network equipment, multiple components can be combined in a single network equipment or a given component can be partitioned over two (2) or more network equipments.

In the following sections, methods and systems are described which implement the service components of this invention, namely, call indication, MWI delivery and call disposition. However, the scope of this invention is not limited to these implementations, which are merely illustrative. Finally, for each service component, a specific service scenario issued for simplicity of description only. The invention is not limited to these service scenarios.

The following data is used in the functional flows:

- caller's DN is Dnc
- caller's name is Name_c

message. The PSTN-G[4] can then provide the DASP-G[6] with the required incoming call indication information. The DASP G[6], through a standard data communication protocol, including but not limited to TCP/IP, HTTP and FTP, communicates the information to the CPE-G[18]. This information is then formatted and displayed to the user.

The terms used are:

- TA: AIN Termination_Attempt trigger
- TA: AIN Termination_Attempt SSP-SCP message
- A_T: AIN Authorize_Termination SCP-SSP message
- IAM: SS7 ISUP Initial Address Message
- ACM: SS7 ISUP Address Complete Message
- ANM: SS7 ISUP Answer Message
- FF: SMDI Forwarded From number
- CdPN: Called Party Number parameter
- CgPN: Calling Party Number parameter
- CgName: Calling Party Name parameter
- OCN: Originally Called Number parameter
- RDI: Redirecting Indicator parameter
- RDN: last Redirecting Number parameter
- RgName: Redirecting Name parameter

Other implementations of this method to deliver the call indication service component are possible. They include but are not limited to the following one.

Referring to Fig. 4 there is illustrated an embodiment of the present method. In this implementation of the invention, the GA[19] is implemented using the SSP-based [2] Call Forward Busy (CFB) telephony feature, the PSTN[4] component is implemented by a PSTN SSP and the PSTN signalling capabilities used are:

- the Signalling System #7 (SS7) Integrated Services Digital Network User Park (ISUP) as interface [11] and [20]
- the Integrated Services Data Network - Basic Rate interface (ISDN-BRI) as interface [12]

protocol as interfaces [11] and [13]. A possibility is for the PSTN-G[4], when an incoming call has been detected using method described in regard to Figs. 2 and 3. Incoming call indication, to start a timer set at the subscriber's [17] maximum allowed message length. At time-out, PSTN-G [4] sends an AIN non-call related Query_Request to SSP [2] requesting for status of subscriber's [17] MWI.SSP [2] answers with the AIN Query_Response with an on/off activation status code parameter. The PSTN-G[4] then provides the DASP-G [6] with the MWI information if necessary. The DASP-G [6], through a standard data communication protocol, including but not limited to TCP/IP, HTTP and FTP, communicates the information to the CPE-G [18]. This information is then formatted and displayed to the user.

The terms used are:

- Q_Req: SS7 AIN
- QUERY_REQUEST SCP-SSP message
- Q_Resp: SS7 AIN Query_Response SSP-SCP message
- P_I: AIN Provide_Info parameter
- I_P: AIN Info-Provided parameter

Other implementations of this method to delivery the MWI delivery service component are possible. They include but are not limited to the following one. Referring to Fig. 6 there is illustrated an additional embodiment of the present invention, the VMS-G [5] component is implemented as an SMDI monitoring tool, the PSTN-G [4] component is implemented by a PSTN SSP and the PSTn signalling capabilities used are:

- the Signalling System #7 (SS7) Transaction Capability Application Part (TCAP) as interfaces [11] and [13]
- the Integrated Services Data Network - Basic Rate Interface (ISDN-BRI) as interface [12]
- the Simplified Message Desk Interface (SMDI) for PSTN to VMS system signalling.

- TAT: AIN Termination_Attempt trigger
- T_A: AIN Termination_Attempt SSP-SCP message
- S_t-R: AIN Send_To_Resource SCP-SSP message
- C_R_E: AIN Cancel_Resource_Event SCP-SSP message
- R_C: AIN Resource_Clear SSP-SCP message
- A_T: AIN Authorize_Termination SCP-SSP message

As discussed above with regard to Figs. 2 and 3: Incoming call indication, the AIN call model on SSP [2] detects incoming calls to subscriber's DN using the Termination_Attempt trigger. The AIN call model also provides the remote call control capability required by the PSTN-G to control call establishment as required by the call disposition service component. To prevent situations where the caller hangs up for waiting too long, the subscriber [17] has a limited time windows (Call_Disp_Timer expires, a default treatment is provided (e.g., route to VMS). Finally, the other options of the call disposition service component (route to DN, route to VMS, route to announcement, route to canned messages, ...) can be implemented using the AIN Forward_Call PSTN-G[4] response to the SSP instead of the Authorize_Termination response.

Those skilled in the art will recognize that various modifications and changes could be made to the invention without departing from the spirit and scope thereof. It should therefor be understood that the claims are not to be considered as being limited to the precise embodiments set forth above, in the absence of specific limitations directed to each embodiment.

through the telecommunications network, to the data processing terminal; and

generating by the data processing terminal, responsive to receipt of the signal, the message waiting indication.

4. A method as claimed in claim 3, wherein the signal is a message including information relating to the incoming call.

5. A method as claimed in claim 4, wherein the message includes information relating to the recorded message.

6. A method of disposing of an incoming call intended for a called station coupled to a telecommunications network, the called station having a data processing terminal engaged in a data call with a data communications network, the data call being through a connection in the telecommunications network to an access gateway for the data network, the method comprising the steps of:

holding call processing of the incoming call at a switching system in the telecommunications network;

providing a signal advising of the incoming call from the access gateway, over the data call connection through the telecommunications network, to the data processing terminal;

receiving from the data processing terminal, via the access gateway, instructions for disposing of the incoming call; and

continuing the call processing of the incoming call at the switching system according to the received instructions.

7. A system for interconnecting a telecommunications network and a data communications network, comprising:

11. A method as claimed in claim 8 wherein the message indicative of an incoming call is an ISDN message.

12. A method as claimed in claim 8 wherein the message indicative of an incoming call is a call waiting indication.

13. A method as claimed in claim 8 wherein the message indicative of an incoming call is a voice message indication.

14. A method as claimed in claim 8 wherein the step of disposing of the incoming call includes forwarding the call to voice mail.

15. A method as claimed in claim 14 wherein the step of disposing of the incoming call includes playing an announcement to the calling party.

16. A method as claimed in claim 14 wherein the step of disposing of the incoming call includes forwarding the call to another line.

17. A method as claimed in claim 14 wherein the step of disposing of the incoming call includes sending a text message.

18. A method as claimed in claim 14 wherein the step of disposing of the incoming call includes answering the call using voice over the data call.

19. A method as claimed in claim 14 wherein the step of disposing of the incoming call includes terminating the data call and accepting the incoming call.

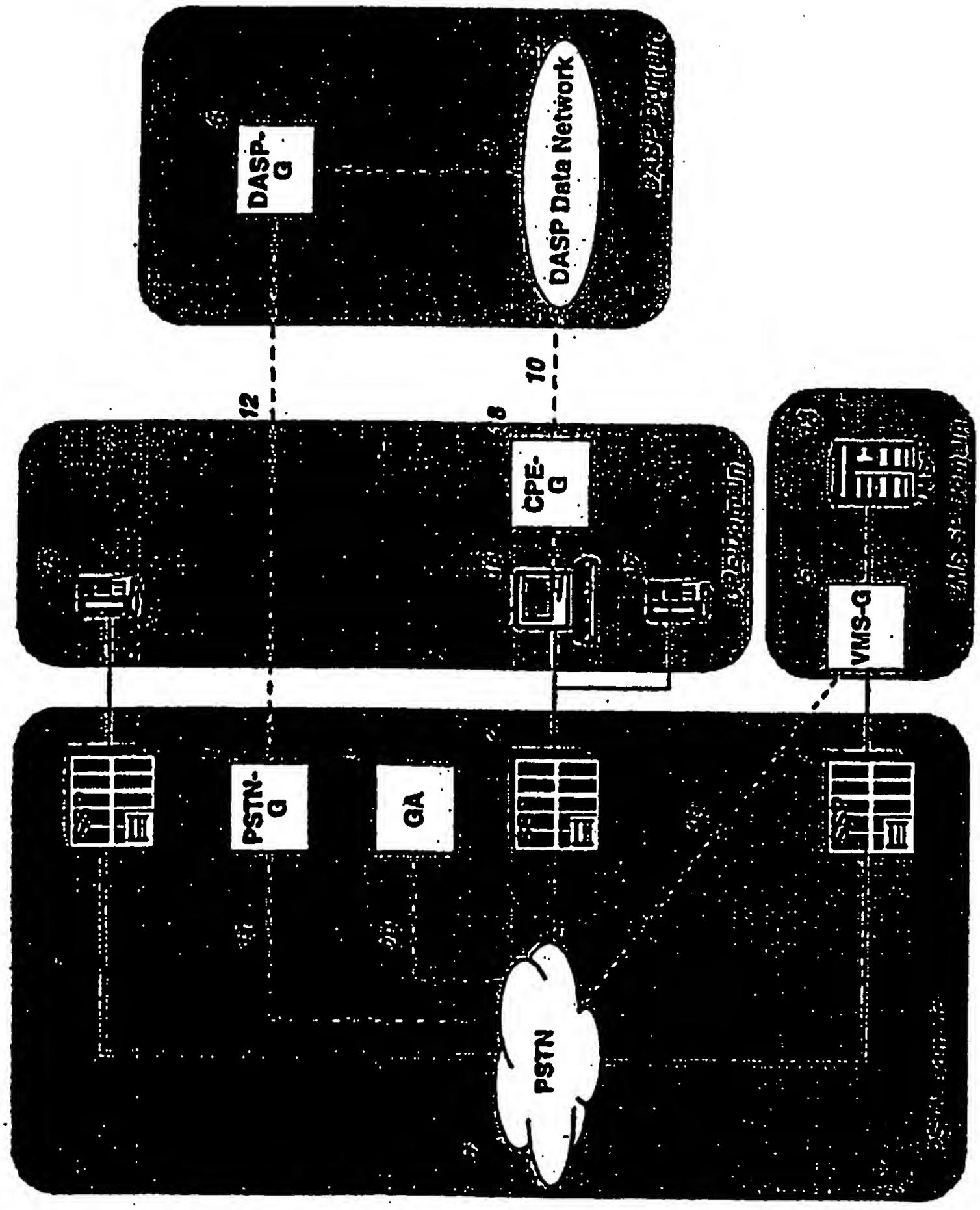


FIGURE 1

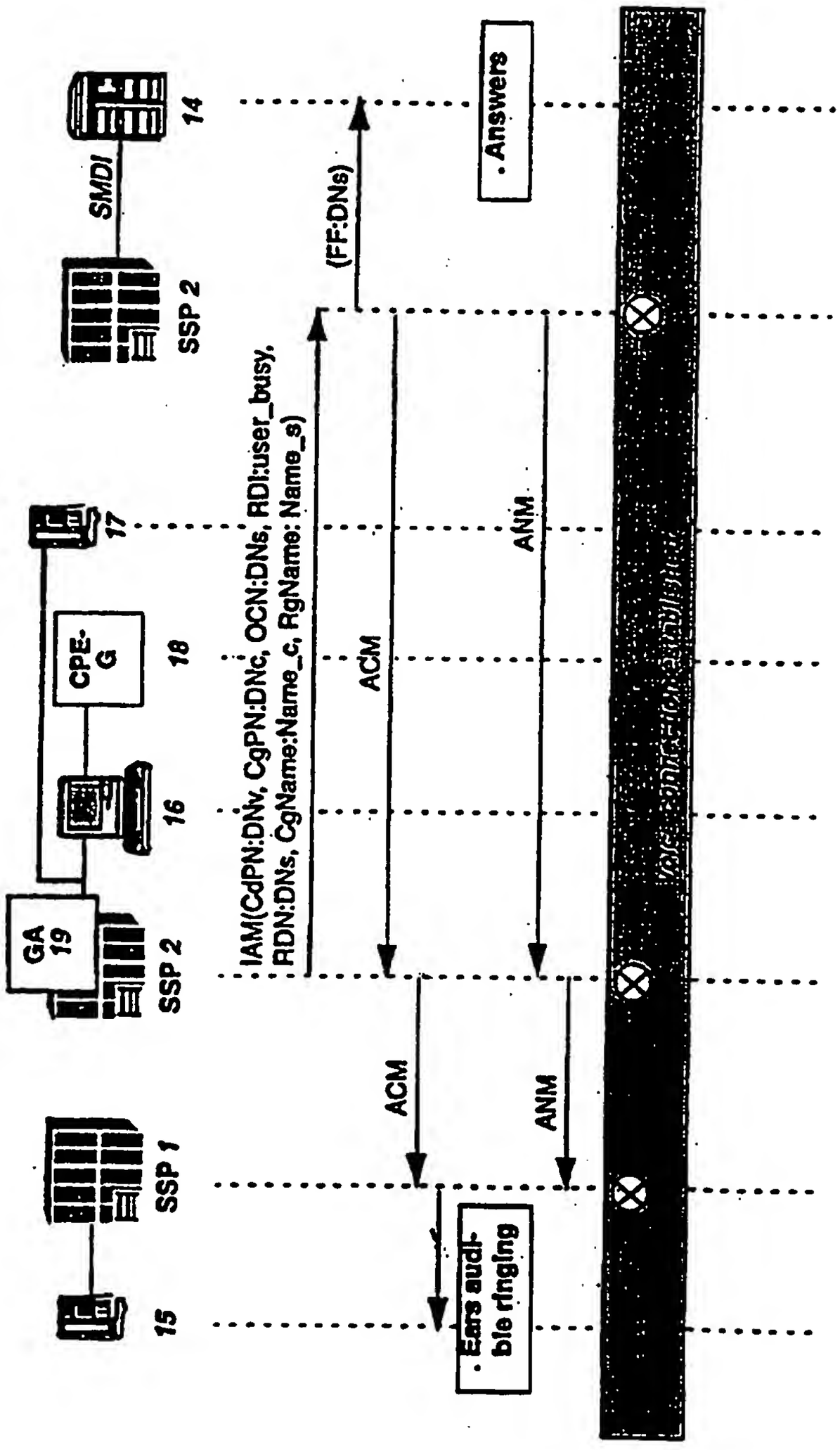
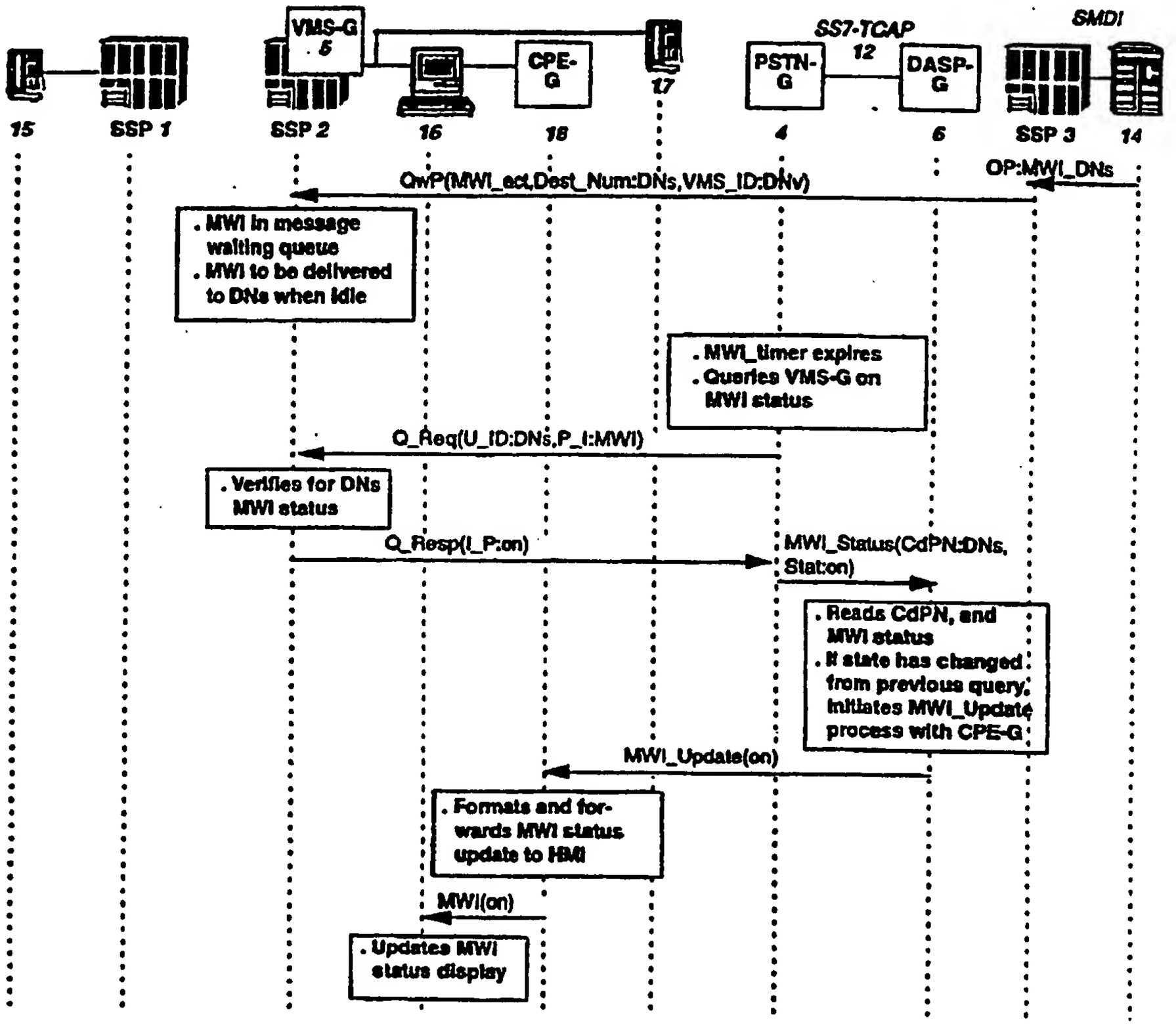

SSP 1
SSP 2
SSP 2
SMDI
14
GA 19
CPE-G
16
18
17
15
IAM(CdPN:DNv, CgPN:DNc, OCN:DNs, RDI:user_busy,
RDN:DNs, CgName:Name_c, RgName: Name_s)
ACM
ANM
ACM
ANM
(FF:DNs)
. Answers
. Ears audible ringing

FIGURE 3



- *U_ID:* *AIN User_ID parameter*
- *OP:MWI* *SMDI MWI activation message*

FIGURE 5

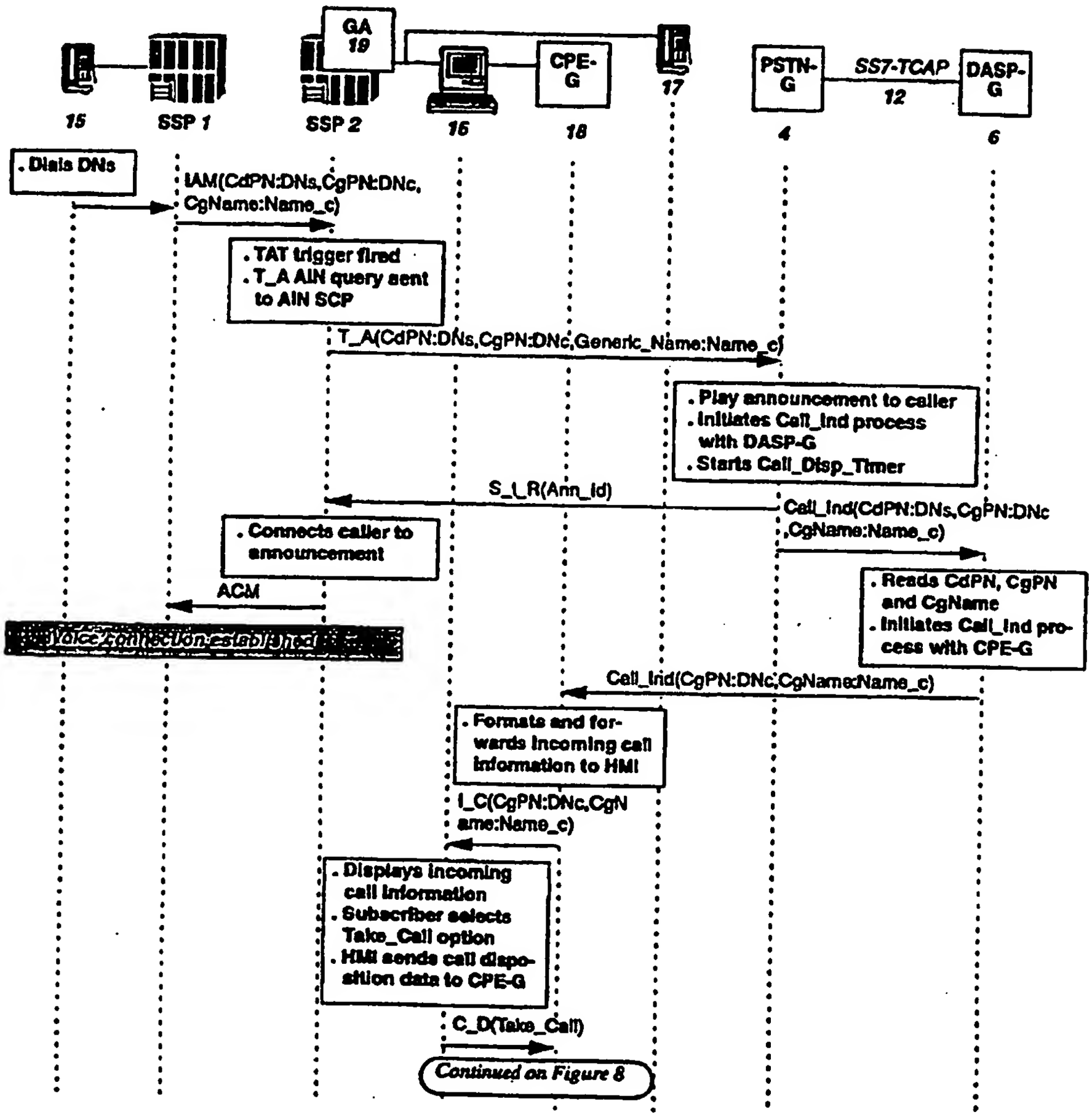

15
SSP 1
GA
19
SSP 2
16
CPE-
G
18
17
PSTN-
G
4
SS7-TCAP
12
DASP-
G
6
. Dials DNs
IAM(CdPN:DNs,CgPN:DNc,
CgName:Name_c)
. TAT trigger fired
. T_A AIN query sent
to AIN SCP
T_A(CdPN:DNs,CgPN:DNc,Generic_Name:Name_c)
. Play announcement to caller
. Initiates Call_Ind process
with DASP-G
. Starts Call_Disp_Timer
S_LR(Ann_Id)
Call_Ind(CdPN:DNs,CgPN:DNc
,CgName:Name_c)
. Connects caller to
announcement
. Reads CdPN, CgPN
and CgName
. Initiates Call_Ind pro-
cess with CPE-G
ACM
Voice connection established
Call_Ind(CgPN:DNc,CgName:Name_c)
. Formats and for-
wards incoming call
information to HMI
I_C(CgPN:DNc,CgN
ame:Name_c)
. Displays incoming
call information
. Subscriber selects
Take_Call option
. HMI sends call dispo-
sition data to CPE-G
C_D(Take_Call)
Continued on Figure 8

FIGURE 7

INTERNATIONAL SEARCH REPORT

Intern nal Application No
PCT/CA 97/00570

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M3/42 H04M3/00 H04M3/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 533 110 A (PINARD DEBORAH L ET AL) 2 July 1996 see column 6, line 11 - column 7, line 8 see figures 1,8	1,2,6,8, 12
Y	"WORKSTATION COMMUNICATIONS SYSTEM" IBM TECHNICAL DISCLOSURE BULLETIN, vol. 37, no. 9, 1 September 1994, pages 101-104, XP000473347 see the whole document	3-5
Y	WO 95 18501 A (GTE LABORATORIES INC) 6 July 1995 see the whole document	3-5

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
16 December 1997	30/12/1997

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INTERNATIONAL SEARCH REPORT

ormation on patent family members

Interr vnal Application No
PCT/CA 97/00570

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